

# California High-Speed Train Project



## TECHNICAL MEMORANDUM

### EMT Radio Frequency (RF) Spectrum Acquisition Strategy TM 300.03

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## **ABSTRACT**

This memo is intended to define a radio frequency (RF) spectrum acquisition strategy and the tasks to support the identified strategy.



## **1.0 INTRODUCTION**

### **1.1 PURPOSE OF TECHNICAL MEMORANDUM**

This memo is intended to define a radio frequency (RF) spectrum acquisition strategy and the tasks to support the identified strategy.

## **2.0 DEFINITION OF TECHNICAL TOPIC**

Not applicable.

## **3.0 ASSESSMENT / ANALYSIS**

The following steps are recommended for:

- Pre-Procurement RF Spectrum Acquisition Tasks
- During and Post-Procurement RF Spectrum Acquisition Tasks

### **3.1 PRE-PROCUREMENT RF SPECTRUM ACQUISITION TASKS**

1. Conduct research to identify compliant or likely-to-be-bid radio technologies from research and Automatic Train Control (ATC) requirements
2. Conduct research to identify appropriate RF spectrum for these identified radio technologies
3. Host vendor RFI meetings and presentations, commission Comsearch RF spectrum search.
4. Develop “Automatic Train Control and Radio Systems: Requirements, Solutions and Radio Frequency Spectrum Challenges” White Paper
5. Conduct RF simulations. RF Simulations verify and validate radio technology, civil infrastructure, provide supporting data for frequency acquisition and provide input to capacity calculations
  - a. GSM-R at 700 MHz PS broadband, 450 MHz and “Native” GSM-R (800-900 MHz) frequencies
  - b. LMR at 160, 450 and 700 NB frequencies
  - c. Other bands / technology as research uncovers
6. Perform capacity / bandwidth calculations to determine minimum RF spectrum needed to support a CHSTP GSM-R system.
7. Summarize ongoing research and investigation into the “RF Matrix” (to be finalized for presentation and discussion)
8. PMT will (while minding projected implementation schedule with respect to FCC build-out requirements) position the CHSRA to acquire any RF spectrum suitable for a GSM-R system, by:
  - a. Interfacing with existing RF spectrum holders suitable for a GSM-R system.
  - b. Disbursing letters to spectrum holders identified by PMT and Comsearch.



- c. EMT is initiating discussions to acquire or sublicense existing holders' RF spectrum for a dedicated CHSTP GSM-R radio system.
9. Continued interface with the FCC and FRA for assistance to identify and acquire suitable RF spectrum.
10. Consult with legal and regulatory experts for assistance to identify and acquire suitable RF spectrum.

### **3.2 DURING AND POST-PROCUREMENT RF SPECTRUM ACQUISITION TASKS**

If CHSRA cannot acquire RF spectrum before procurement of ATC, the EMT / CHSRA will continue above tasks and efforts to acquire spectrum, but will specify that the frequency spectrum acquisition is to be accomplished by the winning design-builder for the following reasons:

- 1) RF spectrum is technology specific. Acquiring RF Spectrum that is not conducive to implementing GSM-R will constrain the design-builder to another technology which they may not be able to utilize.
- 2) Design-builder should be in a position to negotiate directly with spectrum holders to devise detailed technical, legal and business arrangements that allow CHSRA usage of RF spectrum that complies with CHSTP requirements.

## **4.0 SUMMARY AND RECOMMENDATIONS**

### **4.1 SUMMARY**

RF spectrum is a limited natural resource which is used, desired, and demanded by many individuals, government agencies and commercial entities. Increasing demand for services such as mobile cellular broadband has required changes in spectrum management in the US. For many bands and uses, the former practice of licensing discrete bands to groups of similar services has giving way to an auction model that is intended to speed technological innovation and improve the efficiency of spectrum use (spectral efficiency). The sale of spectrum is also a significant revenue earner for the Federal Government.

RF bands of interest to the CHSTP are both allocated and auctioned. Engineering assessment indicates there is a financial or regulatory obstacle to CHSTP's acquisition of adequate spectrum in every band suitable to the CHSTP. Accordingly, the CHSRA has approached the FCC for assistance in identifying appropriate bands and acquisition strategies that will give the CHSTP necessary radio spectrum, without causing the FCC to lose significant income at the same time keeping CHSRA spectrum licensing costs within a reasonable budget.

### **4.2 RECOMMENDATION**

It is recommended to adopt the RF spectrum acquisition tasks as described herein.



## **5.0 SOURCE INFORMATION AND REFERENCES**

Not applicable.



## **6.0 DESIGN MANUAL CRITERIA**

Not applicable.

